The source and the character of enrichment of Tholeiitic magmas developed on the spreading ridges near the Bouvet triple junction

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The Bouvet Triple junction Zone (Bouvet TJ) is characterized by mutual influence of three slow-spreading zones of the South Ocean – MAR, AAR and SWIR, position of which relatively each other has been changing in space and time. Within these zones there are different types of tholeiite magmas but their geochemical features are close by many parameters. By enrichment type the tholeiites belong to E-MORB developed in some segments of the MAR which are under the influence of Discovery hot-spot and at less degree of Shona plume (leRoux *et al*., 2002). Normalized spectrums of incoherent elements of Bouvet TJ basalts are characterized by relative maxima for Nb, Ta, La and minima for Pb and less pronounced for Th and U, and by these parameters are close to the enriched tholeiites of the southern part of the MAR. At the same time, these basalts differ from the plume magmas of Etendeka-Parana – the preceding to the opening of South Atlantic in the region 36-38 º S. Normalized spectrums of Etendeka evolved basalts are characterized by U, Pb and Zr maxima and Nb and Ta minima, which evidence to crust contamination.

Similarities in geochemical and isotope data, in particular, for Sr, Nd, Pb in magmas of the Bouvet triple-junction region and Quaternary alkaline basalts of Antarctica (Hart *et al*., 1997) evidence to the participation in the melting process of material from enriched source, which is developed in the region of west Antarctica and stretches to the west extremity of the SWIR. The enriched component is characterized by high-radiogenic isotope ratios of Pb and Sr and low-radiogenic of neodymium ratio. All these events took place together with destruction of the old and formation of the new Bouvet TJ. As there have been some changes in relative movement of plates in the course of mantle flows migration during the oceanic rift propagations (the western part of the SWIR) and spreading ridges jumping, the melting of the low parts of the earlier formed oceanic lithosphere metamorphosed by the melts of earlier rifting stages was occurred. During rift propagation and jumping of spreading ridge axis within all ridges of the South Atlantic areas have been forming with wide distribution of enriched tholeiites with similar geochemical characteristics. About 2-2.5 Ma ago development of the triple-junction was complicated by Bouvet hot-spot formation in pull-apart style. Such mechanism is suggested for the formation of many islands of the Antarctic peninsula (Hole *et al*., 1993).

The impact craters and linear magnetic anomalies.

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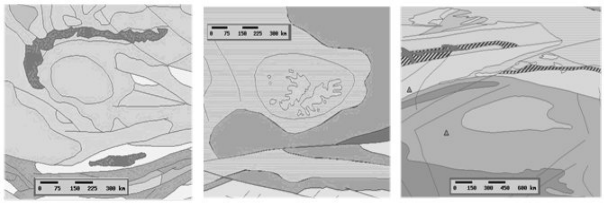
The method description

The big literature where modern representations about methods of the geochronological studying an anomaly magnetic field of the ocean and a structure of inversion magnetic-active layer ([1] etc.) are stated has already collected. A new maps of ocean bottom age are constructed. As an example it is possible to result the Tectonic globe of RSRI "ForeignGeology", served by a cartographical basis for electronic variant [2]. The geometrization of LMA constructions and break structures allows to draw a conclusion on influence on them of various nonlinear geodynamic effects which may be caused as deep processes in geospheres, and various external influences on the ground.

New Results

The analysis of the LMA map [2] allows to locate the clearly circular anomalies in arrangement areas of the known impact craters (see the catalogue [3]). Three of them: a: Pribalhash-Iliyskaya (D=720 km), b: S.Atlantic G.A. (D=300 km) and Popigai (D=100 km) are shown in figure 1.

Figure 1: LMA of known impact craters

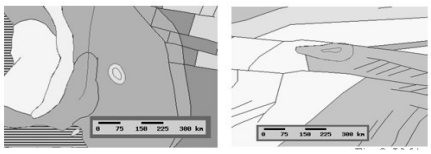


a b c

Conclusions

Proceeding from these supervision, it is possible to assume, that ring structures may become predicting attribute for a task of new astroblems detection. In Figure 2 the examples of similar structures are shown.

Figure 2: LMA of Barbados and Jan Mayen Islands



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